AMENDMENTS TO THE CLAIMS

Please cancel claims 2-3 and 6-7 without prejudice or disclaimer, add claims 9-21, and amend claims 1, 4-5, and 8 as follows:

1. (Currently Amended) A method of controlling a conductivity of a Ga_2O_3 system single crystal, comprising ~~characterized in that~~: ~~a desired resistivity is obtained by~~

adding a predetermined dopant to the Ga_2O_3 system single crystal to obtain a desired resistivity,

wherein said predetermined dopant comprises one of:

a n-type dopant for decreasing a resistance of the Ga_2O_3 system single crystal comprising one of Si, Hf, Ge, Sn, and Ti; and

a p-type dopant for increasing a resistance of the Ga_2O_3 system single crystal comprising one of H, Li, Na, K, Rb, Cs, Fr, Be, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Pb.

2. – 3. (Canceled).

4. (Currently Amended) ~~A~~ The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim ~~2~~ 1, ~~characterized in that:~~ wherein a value of 2.0×10^{-3} to 8.0×10^{2} Ωcm is obtained as the desired resistivity by adding a predetermined amount of said n-type dopant ~~group IV element~~.

5. (Currently Amended) ~~A~~ The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 4, ~~characterized in that:~~ wherein a carrier concentration of the Ga_2O_3

system single crystal is controlled to fall within a range of 5.5 X 10^{15} to 2.0 X $10^{19}/cm^3$ as a range of the desired resistivity.

6. – 7. (Cancelled)

8. (Currently Amended) ~~A~~ The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 1 ~~6~~, ~~characterized in that:~~ wherein 1 X 10^3 Ωcm or more is obtained as the desired resistivity by adding a predetermined amount of said p-type dopant ~~group II element~~.

9. (New) A method of forming a Ga_2O_3 system single crystal layer, comprising:

heating contacting portions of β-Ga_2O_3 seed crystal and a high purity β-Ga_2O_3 polycrystalline raw material, said β-Ga_2O_3 polycrystalline raw material comprising one of a p-type dopant and an n-type dopant.

10. (New) The method of forming a Ga_2O_3 system single crystal layer according to claim 9, wherein said n-type dopant comprises one of Si, Hf, Ge, Sn, and Ti; and

wherein said p-type dopant comprises one of H, Li, Na, K, Rb, Cs, Fr, Be, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Rb.

11. (New) The method of forming a Ga_2O_3 system single crystal layer according to claim 9, wherein said p-type dopant comprises no less than 0.01 mol% and no more than 0.05 mol%.

12. (New) The method of forming a Ga_2O_3 system single crystal layer according to claim 11, wherein a resistance value of said layer is greater than or equal to 1000 MΩ.

13. (New) The method of forming a Ga_2O_3 system single crystal layer according to claim 9, wherein said layer comprises a resistivity of no less than 2.0×10^{-3} Ωcm and no more than 8×10^{2} Ωcm; and

wherein a carrier concentration of said layer comprises no less than $5.0 \times 10^{15} / cm^3$ and no more than $2.0 \times 10^{19} / cm^3$.

14. (New) A light emitting element, comprising:

an n-type β-$AlGaO_3$ cladding layer, an active layer, a p-type β-$AlGaO_3$ cladding layer, and a p-type β-Ga_2O_3 contact layer respectively laminated in order on an n-type β-Ga_2O_3 contact layer, said n-type β-Ga_2O_3 contact layer made of a β-Ga_2O_3 single crystal;

a transparent electrode and a pad electrode respectively formed in order on said p-type β-Ga_2O_3 contact layer; and

an n-side electrode formed over a lower surface of said n-type β-Ga_2O_3 contact layer,

wherein a desired resistivity of said β-Ga_2O_3 single crystal is obtained,

wherein said n-type layers comprise a dopant including one of Si, Hf, Ge, Sn, and Ti, and

wherein said p-type layers comprise a dopant including one of H, Li, Na, K, Rb, Cs, Fr, Be, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Rb.

15. (New) The light emitting element of claim 14, wherein a carrier concentration of said p-type β-Ga_2O_3 contact layer is greater than that of said p-type β-$AlGaO_3$ cladding layer; and

wherein a carrier concentration of said n-type β-Ga_2O_3 contact layer is greater than that of said n-type β-$AlGaO_3$ cladding layer.

16. (New) A method of controlling a conductivity of a Ga_2O_3 system single crystal, comprising:

adding a predetermined dopant to the Ga_2O_3 system single crystal to obtain a desired resistivity,

wherein said predetermined dopant comprises a p-type dopant for increasing a resistance of the Ga_2O_3 system single crystal, said p-type dopant comprising one of H, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Pb.

17. (New) The method of controlling said conductivity of said Ga_2O_3 system single crystal according to claim 16, wherein the predetermined dopant comprises one of:

said p-type dopant; and

an n-type dopant for decreasing said resistance of the Ga_2O_3 system single crystal.

18. (New) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 17, wherein said n-type dopant comprises one of Si, Hf, Ge, Sn, Ti, and Zr.

19. (New) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 17, wherein a value of 2.0×10^{-3} to 8.0×10^{2} Ωcm is obtained as the desired resistivity by adding a predetermined amount of said n-type dopant.

20. (New) The method of forming a Ga_2O_3 system single crystal layer according to claim 19, wherein a carrier concentration of the Ga_2O_3 system single crystal is controlled to fall within a range of 5.5×10^{15} to $2.0 \times 10^{19}/cm^3$ as a range of said resistivity.

21. (New) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 16, wherein 1 X 10^3 Ωcm or more is obtained as the desired resistivity by adding a predetermined amount of said p-type dopant.